

HP StorageWorks

Enterprise Backup Solution with Symantec NetBackup Enterprise Server implementation guide



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Contents

About this guide	4
Overview	4
Intended Audience	4
Prerequisites	4
Related Documentation	4
Conventions	4
Document Conventions	5
Text Symbols	5
Getting Help	6
HP Technical Support	6
HP Storage Website	6
HP Authorized Reseller	6
1 Introduction	7
Overview of Enterprise Backup Solutions	7
History	7
Documentation Goal	7
Solution Features	7
Solution Components	7
Supported Operating Systems and Platforms	8
NetBackup Enterprise Server	8
Important Terms	8
Media Manager/Enterprise Media Manager	9
EBS-Specific Requirements	9
Virtual Library System (VLS)	9
Shared Storage Option	10
Supported Configurations	11
Basic Storage Domain Configurations	11
2 Installation and Configuration	12
Installation Checklist	12
Installation Best Practices	12
Installing Symantec NetBackup Enterprise Server	13
Installing NetBackup Server Software	13
Device Configuration Wizard	13
Device Serialization	14
Creating Policies	14
Performance and Tuning	14
Buffer Allocation	14
File (Data) Compression Ratio	15
Source Disk and File Systems	15
Tape Drive	15
3 High Availability	17
Clustered EBS Configuration	17
4 Troubleshooting	18
A Additional Resources	22
HP Guides	22
Symantec Resources	22
Index	23

About this guide

This implementation guide provides information to help configure Symantec NetBackup Enterprise Server in an HP StorageWorks Enterprise Backup Solution (EBS) environment.

“About this Guide” topics include:

- Overview, page 4
- Conventions, page 4
- Getting Help, page 6

Overview

This section covers the following topics:

- Intended Audience
- Prerequisites
- Related Documentation

Intended Audience

This guide is intended for use by system administrators implementing an EBS configuration who are experienced with the following:

- Tape backup technologies and tape libraries
- SAN environments and backup software
- Fibre Channel technology

Prerequisites

Before installing and configuring a Symantec NetBackup Enterprise Server, make sure to:

- Review the EBS Compatibility Matrix
- Properly install and configure the EBS hardware per the *HP StorageWorks EBS Design Guide*

Related Documentation

In addition to this guide, HP provides corresponding information:

- EBS Compatibility Matrix
- HP StorageWorks EBS Design Guide
- HP blueprints
- HP StorageWorks SAN Design Guide

Conventions

Conventions consist of the following:

- Document Conventions
- Text Symbols

Document Conventions

The document conventions included in [Table 1](#) apply in most cases.

Table 1 Document Conventions

Element	Convention
Cross-reference links	Figure 1
Key and field names, menu items, buttons, and dialog box titles	Bold
File names, application names, and text emphasis	Italics
User input, command and directory names, and system responses (output and messages)	Monospace font COMMAND NAMES are uppercase monospace font unless they are case sensitive
Variables	<monospace, italic font>
Website addresses	Underlined sans serif font text: http://www.hp.com

Text Symbols

The following symbols may be found in the text of this guide. They have the following meanings.

⚠ **WARNING!** Indicates that failure to follow directions could result in bodily harm or death.

⚠ **CAUTION:** Indicates that failure to follow directions could result in damage to equipment or data.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Getting Help

If there are questions after reading this guide, contact an HP authorized service provider or access our website: <http://www.hp.com>.

HP Technical Support

Telephone numbers for worldwide technical support are listed on the following HP website: <http://www.hp.com/support/>. From this website, select the country of origin.

NOTE: For continuous quality improvement, calls may be recorded or monitored.

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

HP Storage Website

The HP website has the latest information on this product, as well as the latest drivers. Access storage at: <http://www.hp.com>. From this website, select the appropriate product or solution.

HP Authorized Reseller

For the name of the nearest HP authorized reseller, see the HP website for locations at: <http://www.hp.com/go/locator>.

1 Introduction

Overview of Enterprise Backup Solutions

Properly setting up a Fibre Channel storage area network (SAN) backup solution can be challenging. Typically, components are purchased at different times and arrive separately or the components are purchased from different vendors. Each piece of hardware arrives with its own documentation for setup and deployment. These challenges may require additional time and money. HP is committed to keeping these challenges to a minimum by providing the *HP StorageWorks Enterprise Backup Solution Design Guide* and this implementation guide.

History

HP has developed a comprehensive approach to ensuring that all hardware, firmware, driver, and software components are properly fitted into the HP StorageWorks Enterprise Backup Solution (EBS). HP has developed best practices to follow when setting up backup SANs. Data protection software is tested to provide best practices and ensure backups/restores run at optimum efficiency.

Documentation Goal

This guide is intended to address many of the integration issues that occur when setting up backup environments and to provide suggestions for the best solution. This guide does not provide specific documentation for installing and configuring data protection software. Within this document, HP refers to the appropriate documentation when necessary. This guide covers special configuration issues that might not be covered in the vendor's documentation.

Refer to the *HP StorageWorks Enterprise Backup Solutions Design Guide* for specific hardware setup and configuration.

Configuration rules and recommendations are based on solution integration testing conducted by HP. This guide is not all inclusive. Certain limitations may apply and are noted where applicable.

Solution Features

HP StorageWorks Enterprise Backup Solution with Symantec NetBackup™ integrates data protection and archival strategies with disk storage subsystems across multiple platforms and operating systems located on the same SAN or independent SANs interconnected with the HP StorageWorks Multi-Protocol Router (MPR). This solution provides for the interconnection of multiple heterogeneous servers to multiple backup devices using dynamic device sharing technology.

Servers can share one or more HP StorageWorks tape libraries or Virtual Library Systems (VLS) interconnected through HP StorageWorks Fibre Channel SAN Switches. Online storage, such as HP StorageWorks XP disk arrays, Enterprise Virtual Arrays (EVA), Modular Smart Arrays (MSA), and others, can also be attached to the switch.

To determine the compatible hardware components for this system, go to the HP EBS Compatibility Matrix <http://www.hp.com/go/ebs>.

Solution Components

- Server(s) containing Fibre Channel host bus adapter(s)
- RAID array storage
- Fibre Channel SAN switch(es)
- Router(s), such as the HP StorageWorks E2400-160 FC Interface Controller or the HP StorageWorks Network Storage Router E1200-160
- HP StorageWorks Virtual Library System (VLS)
- Enterprise Class Tape Libraries utilizing Extended Tape Library Architecture (ETLA)
- Business class tape libraries
- Symantec NetBackup Enterprise Server

The NetBackup master server manages data protection operations and controls the flow of information between tape libraries and servers. When a NetBackup job requiring tape resources is ready to run, the application checks to ensure that all of the resources needed for the job are available (media device within the specified shared device group, volume within the specified volume pool). At this point, the application allocates the required resources to the job and SCSI reserves the media device to the server performing the job so that the device cannot be allocated to any other server in the NetBackup storage domain for the duration of that job.

NetBackup accommodates multiple servers working together under the administrative control of one NetBackup master server. The master server manages backups, archives, and restores. Media servers are directed by the master server and provide additional storage by allowing NetBackup to use the storage devices that they control. Media servers can also increase performance by distributing the network load. A master server may also function as a media server.

Supported Operating Systems and Platforms

The Enterprise Backup Solution (EBS) with Symantec NetBackup Enterprise Server supports several operating systems and platforms.

Refer to the EBS Compatibility Matrix for a complete list of operating systems and platforms. Refer to the *HP StorageWorks EBS Design Guide* for detailed instructions on SAN configuration of each operating system.

NetBackup Enterprise Server

Symantec NetBackup Enterprise Server is based on the client/server architecture, and comprises three distinct components:

- Master server
- Media server
- Client

This three-tier architecture provides the flexibility and performance required to protect and manage data on the most complex networks. It also allows tape libraries to be shared within a data zone.

NetBackup client software enables server directed backup, archive, and restore operations on entire folders, directories, or individual files that reside on the NetBackup client. This software also performs user directed backup, archive, and restore operations on the NetBackup client, without logging into the NetBackup master server. When starting a user directed or a scheduled operation, the NetBackup process runs under the control of the NetBackup master server. Request the service and the NetBackup master server manages the rest, including storage and retrieval of data.

Important Terms

- **Master Server**—The master server manages data protection operations. Any computer that has NetBackup server software installed can be designated as the master server. There can be only one master server per storage domain. The NetBackup master server is responsible for the following functions:
 - Containing the backup configurations and policies
 - Running the scheduler that initiates automated backups
 - Maintaining catalogs that track the location and contents of all backups
 - Communicating with media servers to initiate backup and restore processes
 - Providing both a command line interface and a graphical user interface to administer NetBackup
- **Enterprise Media Manager Server** (NetBackup 6)—NetBackup Enterprise Server 6.0 introduced the Enterprise Media Manager (EMM) server, which centrally manages Media Manager data that had previously been distributed across multiple media servers. There can be only one EMM server per storage domain. The master server can also be designated as the EMM server. The NetBackup EMM server is responsible for the following functions:
 - Managing a consolidated media and device database for the NetBackup storage domain
 - Maintaining run-time status information, NDMP credentials, and a managed server list
- **Media Server**—A media server can be any standalone server running NetBackup server software that receives requests for backup and restore operations from the master server. (A master server can

also be configured as a media server.) A storage domain can contain multiple media servers. Media servers perform the following functions:

- Communicate with the master server and EMM server (beginning with NetBackup 6) to initiate backup and restore operations on its attached storage devices
- Communicate with NetBackup clients during a backup or restore operation
- Monitor the status of storage devices
- Provide robotic control

NOTE: There can be only one robotic control host per library.

- **Client**—NetBackup clients are servers that have NetBackup client software installed. With the proper conditions set, a client can perform the following functions:
 - Perform backups over the LAN through a media server
 - Validate connection requests from the NetBackup server
 - Support compression of the backup stream
 - Support include and exclude lists
- **Storage Unit**—A storage unit consists of the media server and tape devices where NetBackup stores files and data. If a storage unit contains two drives and one is busy, NetBackup can use the other drive without administrator intervention.

A NetBackup storage unit is a storage device attached to a NetBackup server. To send backups to a storage device, the administrator needs to define storage units using the Device Configuration Wizard.

Two types of storage units can be used in an EBS environment:

- **Media Manager storage units**

This type of storage unit encompasses the tape robots, standalone tape drives, and optical disk devices—all of which are under the control of Media Manager or EMM. Media Manager or EMM controls the allocation and mounting of media (called volumes) in the storage devices.
- **Disk storage units**

A disk type of storage unit consists of a directory on a disk that stores data. NetBackup permits an unlimited number of disk storage units.

Media Manager/Enterprise Media Manager

Media Manager or Enterprise Media Manager (EMM), which are components of NetBackup, manages the robots, tape drives, and removable media. Media Manager or EMM primarily uses four tools:

- The Device Configuration Wizard, which guides you through device configuration in a step-by-step manner.
- The Volume Configuration Wizard, which guides you through volume configuration in a step-by-step manner.
- The Media and Device Management graphical interface, which allows you to reconfigure storage devices and volumes separately.
- The Device Monitor graphical interface, which displays pending requests for volumes and allows you to control and manage devices.

EBS-Specific Requirements

EBS with Symantec NetBackup Enterprise Server requires the Shared Storage Option to be installed on all media servers. One server must be designated as the master server, while the others will be designated as media servers. Refer to Symantec documentation for details on the minimum requirements of each server: <http://support.veritas.com>.

Virtual Library System (VLS)

When configuring the HP StorageWorks Virtual Library System (VLS) for use in an EBS environment with Symantec NetBackup, “HP VLS” must be selected as the library emulation. NetBackup requires the use of this emulation in all HP StorageWorks VLS products for device support purposes.

Shared Storage Option

The Shared Storage Option (SSO) allows individual tape drives to be dynamically shared between multiple NetBackup media servers. Each media server can access any of the shared drives as needed and each server “owns” the drive it has active. The shared drives are automatically allocated and deallocated as backup and restore operations dictate.

NetBackup provides the Device Configuration Wizard to make configuring shared drives fast and easy. Using this wizard helps eliminate common mistakes that are made when SSO configuration is done manually.

The wizard should be run on all media servers. The wizard:

- Performs device discovery
- Adds robotic libraries and shares drives to the Media Manager configuration
- Creates storage units
- Allows use of device persistency services
- Allows NetBackup to use device serialization (if supported by the robot or tape device)

Supported Configurations

Figure 1 shows a diagram of a basic storage domain configuration. Refer to the EBS Compatibility Matrix and the *HP StorageWorks Enterprise Backup Solution Design Guide* to be sure system components are included in the compatibility matrix, and that the hardware is properly configured.

Basic Storage Domain Configurations

The basic EBS storage domain may consist of a heterogeneous connection of multiple servers sharing multiple libraries and RAID array storage systems.

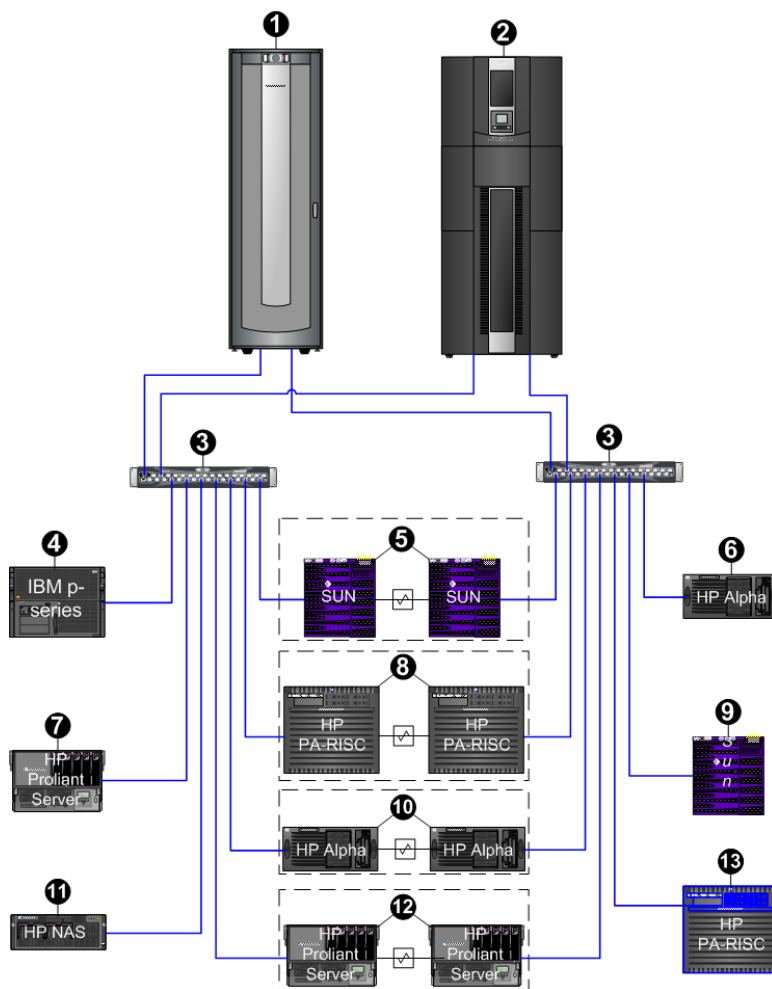


Figure 1 Basic storage domain configuration

- | | | | |
|----|--------------------------|----|--------------------------|
| 1 | RAID array storage | 2 | HP tape library storage |
| 3 | FC SAN switch | 4 | IBM p-series UNIX server |
| 5 | Sun Solaris UNIX cluster | 6 | HP AlphaServer |
| 7 | HP ProLiant server | 8 | HP PA-RISC cluster |
| 9 | Sun Solaris UNIX Server | 10 | HP AlphaServer cluster |
| 11 | HP NAS server | 12 | Microsoft cluster |
| 13 | HP PA-RISC server | | |

2 Installation and Configuration

Before installing your backup software, refer to the *HP StorageWorks EBS Design Guide* for assistance in setting up your hardware.

Installation Checklist

If the answer to each of the following questions is “yes”, then all components on the SAN are logged in and configured properly.

- Are all hardware components at the minimum supported firmware revision (HBA, Fibre Channel switch, router, Interface Manager (IM), tape library drives, tape library robot)?
- Is the minimum patch level support for the operating system installed?
- Are the minimum supported drivers installed (HBA, tape drives)?
- Is the tape library online?
- Are all tape and robotic devices mapped and configured on the router or in Command View TL?
- Is the router correctly logged into the Fibre Channel switch?
- Is the host server correctly logged into the Fibre Channel switch?
- If the Fibre Channel switches are cascaded or meshed, are all Interswitch Link (ISL) ports correctly logged in?
- Are the router and the host server HBA in the same switch zone (by World Wide Name (WWN) or Port)?
- Does the host server detect all of the tape and robotic devices intended to be used?

NOTE: HP recommends placing devices in host-centric zones and then making them available to the server. Host-centric zoning is implemented by creating a specific zone for each server or host and adding only those storage elements that will be utilized by that host. Host-centric zoning prevents a server from detecting any other devices on the SAN, including other servers. Host-centric zoning also simplifies the device discovery process.

Installation Best Practices

- Follow the HP StorageWorks EBS Compatibility Matrix and the *HP StorageWorks Enterprise Backup Solution Design Guide*.
 - The matrix of hardware, software, and firmware is updated monthly and helps customers and support personnel maintain their EBS environment. It is not necessary to immediately update an environment to the latest revision on the matrix. However, be aware of updates and changes if any problems occur that may be related to newer or older software, driver, and/or firmware versions.
 - The design guide describes currently supported EBS hardware configurations and how to efficiently and effectively provide shared tape library backup in a heterogeneous SAN environment.
- Use SCSI RESERVE/RELEASE.
 - SCSI RESERVE/RELEASE is enabled by default in Symantec NetBackup Enterprise Server.
- Use the Device Configuration Wizard.
 - This wizard coordinates device configuration among all the hosts in a shared storage environment. It is essential that all hosts be configured properly with the appropriate device name, index, robot drive number, media, and drive type.

NOTE: Using the Device Configuration Wizard allows NetBackup to use drive serialization. If the library/drives are configured manually, serialization will not be used and may cause issues.

- Limit rebooting during backup windows.

- Rebooting servers in a SAN environment during the backup operations of another server can cause job failures and/or configuration errors.
- When rebooting is necessary, verify the tape device configuration of the host remains unchanged when maintenance or reboot is complete. Re-run the configuration wizard if necessary.
- For mixed media environments, refer to the *HP StorageWorks Implementating Mixed Media in HP StorageWorks Tape Libraries Implementation Guide* by selecting the “Technical documentation” link at <http://www.hp.com/go/ebs>.

Installing Symantec NetBackup Enterprise Server

After all components on the SAN are logged in and configured, the system is ready for installation of NetBackup Enterprise Server. Refer to the Symantec NetBackup Installation Guide or contact Symantec customer support for detailed installation procedures and requirements.

Symantec provides several wizards to help you install and configure the master server and media servers.

Installing NetBackup Server Software

Symantec recommends installing in the following order:

1. For NetBackup 6.0 and later, install Infrastructure Core Services/Private Branch Exchange (ICS/PBX) on all servers (for older versions, proceed to step 2)
2. Master server
3. Media servers
4. NetBackup Remote Administration Console (if any)
5. NetBackup clients
6. NetBackup add-on products (such as NetBackup for Oracle)

NOTE: HP recommends backup software currently configured on your system be removed before installing NetBackup.

The following items can negatively affect how NetBackup installs and functions:

- Other backup software
 - Tape device applications that are part of the operating system or test utilities
 - SAN or system management software
-

Device Configuration Wizard

After installing NetBackup software, storage devices must be defined before any backups can be run.

NetBackup provides the Device Configuration Wizard to make configuring shared drives fast and easy. Using this wizard helps eliminate common mistakes that are made when SSO configuration is done manually.

HP strongly recommends using the Device Configuration Wizard.

NOTE: Be sure that all media servers have the latest Symantec NetBackup maintenance pack or feature pack installed. For additional information visit the Symantec support website: <http://support.veritas.com>.

Use the Device Configuration Wizard to:

- Specify device hosts in NetBackup 5.x or earlier (in NetBackup 6.0, device hosts are automatically added to the Enterprise Media Manager (EMM) database and do not need to be specified)
- Scan hosts for back-up devices
- Verify the devices that were automatically detected
- Verify and correct the drive configuration
- Update the drive configuration

- Configure storage units

NOTE: Be sure to stop and restart NetBackup services on the master server after adding a storage unit, otherwise the master server will return a message that says the storage unit is not available.

Device Serialization

The Device Configuration Wizard uses device serialization, a library feature that allows device identification and configuration. Each robot and drive found in the configuration returns a unique serial number. For any robots in the configuration, an additional command is issued to the robot. The robot returns the number of drives and the serial number for each of the drives contained in the library. This information is used by the wizard to determine the correct drive number for each drive in the library.

NOTE: If the Device Configuration Wizard is unable to detect serial numbers of the robot or tape drives, (which can happen when the drive or library firmware is upgraded) check via the library front panel to ensure the library reports a serial number for each device.

Creating Policies

A policy must be created before performing a backup.

- A schedule must be created.
- A policy can contain multiple clients, but all clients must be the same type, such as Windows or Standard.
- After creating a policy, run a manual backup to test the policy.

Performance and Tuning

To analyze speed and performance, it is necessary to examine the entire backup process as a system. Although many factors contribute to the overall performance of the system, there are five main factors that must be thoroughly understood to determine the maximum performance in any specific situation. These factors are:

- Storage Connection—For EBS, this is the Fibre Channel connection.
- Buffer Allocation—EBS with Symantec NetBackup Enterprise Server supports configurable buffer sizes. See “Buffer Allocation” for specified details.
- File (Data) Compression Ratio—The amount of compression has a direct impact on the rate at which a tape drive can read/write data.
- Source Disk and File Systems—Data source, local disk, RAID array storage, file system type, and volume type.
- Tape Drive—In the EBS, these are the various types of tape drives in HP StorageWorks Libraries.

Buffer Allocation

Buffer sizes can be set to maximize the performance of tape drives. Two text files, `SIZE_DATA_BUFFERS` and `NUMBER_DATA_BUFFERS`, created in `<install_path>/netbackup/db/config/`, are used to optimize the tape drive buffers. For documentation on modifying buffer sizes, refer to <http://support.veritas.com>.

NOTE: If either of these files are changed, be sure that the new specifications are appropriate for all media on that media server.

File (Data) Compression Ratio

HP tests show that not all data can be compressed equally. The compression ratio affects the amount of data that can be stored on each tape cartridge, as well as the speed at which the tape drives can read or write the data. [Table 2](#) shows typical compression ratios of various applications.

Table 2 Typical File Compression Ratios

Data Type	Typical Compression
CAD	3.8:1
Spreadsheet/Word Processing	2.5:1
Typical File/Print Server	2.0:1
Lotus Notes Databases	1.6:1
Microsoft Exchange/SQL Server Databases	1.4:1
Oracle/SAP Databases	1.2:1

Source Disk and File Systems

In the past, tape performance was typically identified as a bottleneck. However, tape performance has now surpassed many of the source systems available today. Items to consider when calculating desired throughput and performance metrics include:

- Source hardware (disk subsystems)
- Source filesystem status
- Server configuration

The following factors critically affect the speed of backup from disk to tape:

- Data file size
The larger the number of smaller files, the larger the overhead associated with backing them up. The worst-case scenario for backup is large numbers of small files due to system overhead of file accession.
- Data compressibility
Incompressible data will back up slower than higher compressible data. For example, JPEG files are not very compressible, but database files can be highly compressible. The accepted standard for quoting tape backup specifications revolves around an arbitrary figure of 2:1 compressible data.
- Disk array performance
It is often overlooked that data cannot be put onto tape any faster than it can be read from disk. Backup is more sequential in nature than random (from a disk array access perspective).
Disk array performance depends on the number of disks, RAID configuration, the number of Fibre Channel ports accessing the array, and queue depth available, for example.
- Fragmentation
The more fragmented the files are on disk, the more random will be the disk access method, hence the backup will take longer. If the system has a defragmentation utility, it is advisable to run it before full backups or on a regular scheduled basis to ensure that files are contiguously arranged on the disk.
For more information on factors that can affect tape performance see the *Getting the most performance from your HP StorageWorks Ultrium 960 tape drive* white paper:
<http://h18006.www1.hp.com/storage/tapewhitepapers.html>.

Tape Drive

The tape drive is the fifth factor in determining backup and restore performance. HP tape drives have varying levels of performance. Factors such as file size (larger is better), directory depth, and data compressibility all affect system performance. Data interleaving during backup also affects restore

performance. Use of the router and its connections to HP StorageWorks tape libraries is a simple way to scale backup performance. [Table 3](#) shows performance information for various tape drives.

Table 3 Tape Drive Throughput Speed (native)

Tape Drive	Throughput MB/s
Ultrium 960	80
Ultrium 460	30
Ultrium 230	15
SDLT 600	36
SDLT 160/320	16

3 High Availability

For information on configuring Microsoft Cluster, TruCluster, and Symantec Cluster Server for Solaris, refer to the *Symantec NetBackup High Availability Guide*: <http://support.veritas.com>.

This guide provides information on how to install and configure NetBackup Enterprise Server to work with different clustering solutions.

Limitations of using NetBackup with clustering solutions:

- Unless stated otherwise, NetBackup add-on options are not supported in cluster environments.
- Converting an existing non-failover NetBackup server to a highly available failover NetBackup server is not supported.

NOTE: When installing ICS/PBX in a TruCluster, respond “yes” when asked to install ICS/PBX as a TruCluster application.

Clustered EBS Configuration

The EBS with Symantec NetBackup Enterprise Server supports backup and restore of the primary and secondary nodes of a clustered pairs.

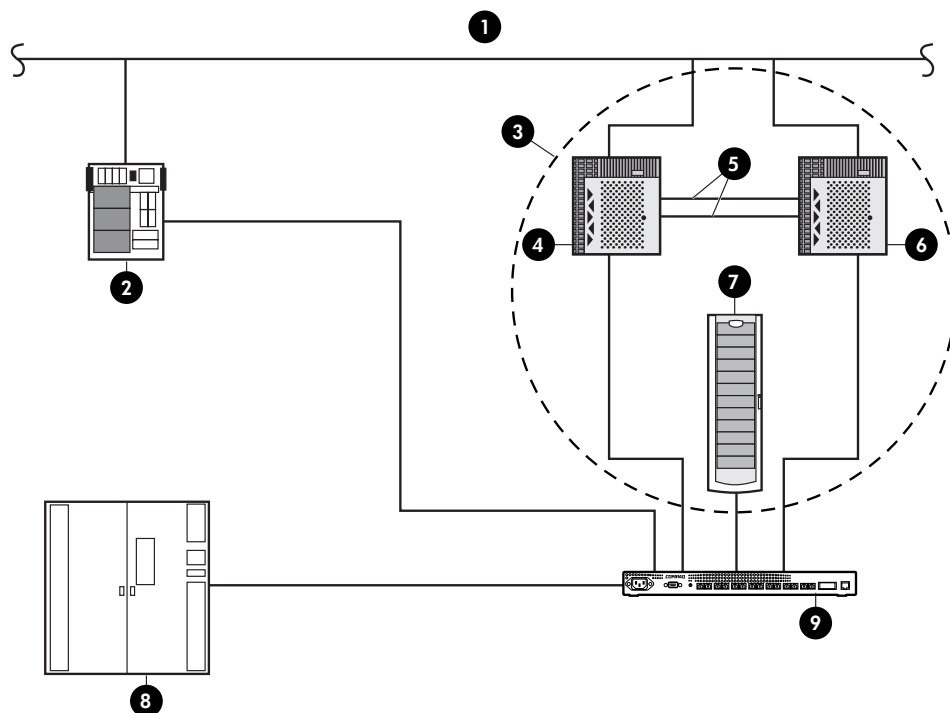


Figure 2 Clustered server EBS configuration

- | | | | |
|---|---------------------------|---|-------------------------------------------------------|
| 1 | Ethernet | 2 | Master server |
| 3 | Microsoft Cluster servers | 4 | Media server node 1 |
| 5 | Private Ethernet link | 6 | Media server node 2 |
| 7 | RAID array storage | 8 | HP tape library with embedded FC Interface Controller |
| 9 | FC SAN Switch | | |

4 Troubleshooting

This chapter outlines troubleshooting strategies for problems that can occur during installation, implementation, and administration of the HP StorageWorks Enterprise Backup Solution (EBS) with Symantec NetBackup Enterprise Server.

Additionally, you can refer to the NetBackup Troubleshooting Guide for your operating system available <http://support.veritas.com>.

Table 4 Troubleshooting EBS Components

Symptom	Cause	Resolution
NetBackup: Database and/or Request Manager service does not start.	Host name resolution is failing.	Confirm that the host file or DNS is configured and up to date on every media server.
NetBackup: Unable to exercise robot with Robtest on the robot control host (usually the NetBackup master).	Cause A: The library is configured improperly in NetBackup.	Resolution A: Run the NetBackup device configuration wizard to properly configure library and tape devices.
	Cause B: The library is inaccessible by the robot control host.	Resolution B: Verify that the robotic device is still detected and accessible by the operating system. If the device is not detected, it is most likely a device or physical device path issue. If the device is detected but not accessible, there is most likely a conflict with another server or application.
NetBackup: Activity Monitor displays Error 37 after attempting a backup.	Operation request (backup/restore) made by invalid server.	Add new media server to the Master server's server list.
NetBackup: Unable to delete media from media and device manager GUI.	Media is assigned or out of sync.	Run <code>'bpexpdate'</code> from the command prompt to expire media. If that fails, run <code>'vmquery'</code> to de-assign media, then run <code>bpexpdate</code> .
NetBackup: Tape drive(s) is continually downed in NetBackup.	Tape drive accessibility issue.	Verify that the tape device(s) is still detected and accessible by the operating system. If the device(s) is not detected, it is most likely a device or physical device path issue. If the device is detected but not accessible, there is most likely a conflict with another server or application.

Table 4 Troubleshooting EBS Components

Symptom	Cause	Resolution
NetBackup: Shared tape drive is in a 'PENDING' state in the NetBackup device monitor.	Device is currently reserved by another application or server independent of the NetBackup data zone.	Determine which server is reserving the device, and then determine the application on that server that is accessing the device.

Table 4 Troubleshooting EBS Components

Symptom	Cause	Resolution
NetBackup: Activity Monitor displays Error 219 after attempting a backup.	Cause A: Downed drives	Resolution A: Run NetBackup Device Manager utility and 'up' all downed drives. If drives continue to go down there may be a device accessibility issue.
	Cause B: No storage unit has been created.	Resolution B: Run the Storage Unit Management utility and confirm the storage unit configuration or create a valid storage unit that associates the library to the media server.
	Cause C: Tape library is offline.	Resolution C: Press the Standby toggle button on the tape library touch pad to put the tape library online.
	Cause D: Master server processes not restarted after creating a new storage unit.	Resolution D: Restart NetBackup services on the NetBackup master server.
NetBackup: Error 70 - connectivity to oprd on host cannot connect to vmd.	There is a problem with TCP/IP networking.	Double check host tables and/or DNS entries. Be careful of case sensitivity. If using DNS, make sure host tables are used secondly to DNS server.
NetBackup: Media Server cannot mount tape via robot when job is started.	Host is not registered in the SCAN HOST's database.	Check host registration by running vmdareq (see VERITAS Admin. and Media Manager Guides). If host is not registered, start and stop the host's NetBackup services. Sometimes NetBackup times out (depending on mount timeout settings) and registers on the second attempt.
NetBackup: Backup media never mounted and backup job remains active indefinitely. Server requesting mount receives NetBackup error "ltid: Media Manager error 70, cannot connect to vmd..."	Robot control host is too busy to acknowledge the mount request, and the NetBackup "media mount timeout" global attribute is set to 0 (zero) which means "never timeout."	On the NetBackup master server set the "media mount timeout" global attribute to some value greater than zero. The mount request will then timeout and the server will retry the backup job.

Table 4 Troubleshooting EBS Components

Symptom	Cause	Resolution
NetBackup: The first few attempts of a backup job result in error 134, after which the job runs and successfully completes.	The tape drives in the selected storage unit are busy when the job is attempted.	This is normal NetBackup behavior. The job will run when resources become available.
Media Server: Jobs stay active for an indefinite period of time.	FC connectivity to library may have been lost.	Ensure that the library is powered on and online. Ensure that all Fibre Channel and SCSI data paths are intact.
NetBackup: The backup goes to a remote media server.	"Any Available" storage unit is selected in a NetBackup policy.	Select "Must Use Local Drive" in NetBackup Media Server configuration window for each server.
UNIX: NetBackup Java GUI hangs.	Not enough system resources allocated for Java server processes.	Allocate additional memory for jre by modifying the INITIAL_MEMORY and MAX_MEMORY options in the jnbSA and jbpSA scripts. Increase the INITIAL_MEMORY default by 4m increments and the MAX_MEMORY default by 32m increments until the problem is resolved.
Tape Library: Unable to execute wide SCSI commands. For example, the library may respond to some, but not all SCSI commands.	Typically indicates a bad electrical connection on pins used for wide commands.	Replace cables, terminators, and devices located on the BUS where fault is located.
Cluster: Failover of active backup job after a hard node failure (NetBackup not shutdown properly) takes about 2 hours.	TCP socket opened by NetBackup remains open but idle until the operating system cleans up sockets that do not exit cleanly.	TruCluster: Modify the inet subsystem kernel parameter tcp_keepidle (default is 2 hours) on all cluster nodes configured to run the NetBackup failover application.

A Additional Resources

The HP StorageWorks Enterprise Backup Solution website has many useful white papers, tech notes, blueprints, and related user guides to assist in using backup software solutions in an EBS environment. View this information at: <http://h18004.www1.hp.com/products/storageworks/ebs/description.html>

HP Guides

The following is a list of other HP guides for assistance in using backup software solutions in an EBS environment.

- *HP StorageWorks Enterprise Backup Solutions Design Guide*
- *HP StorageWorks Enterprise Backup Solution with Symantec NetBackup Enterprise Server Implementation Guide (this guide)*
- *HP StorageWorks SAN Design Guide*
- *HP StorageWorks E2400-160 FC Interface Controller User Guide*
- *HP StorageWorks Enterprise Backup Solution Example Configurations*

Symantec Resources

Visit the Symantec support website at <http://support.veritas.com>. This site includes:

- Searchable Knowledge Base
- Technical documentation
 - Manuals
 - Frequently Asked Questions
 - All recent publications
 - White Papers
- Compatibility documents

Index

A

administration troubleshooting 18
audience 4
authorized reseller, HP 6

B

backup policy configuration wizard 14
backups, limit reboots during 12
buffer allocation 14
buffer sizes, setting 14

C

clients, NetBackup
 defined 9
clustering 17
configurations
 basic storage domain 11
 basic storage domain, illustrated 11
 supported 11
conventions
 document 5
 text symbols 5

D

data compression ratio
 defined 14
 typical 15
device configuration wizard 9
 best practices 12
 do not use in some environments 12
 functions 10, 13
device monitor GUI 9
device serialization 14
disk subsystems 15
DLT8000, device configuration wizard 12
document
 conventions 5
 goal 7
 prerequisites 4
 related documentation 4

E

EBS
 overview
 requirements 9
Enterprise Backup Solutions. See EBS.
Enterprise Media Manager Server
 defined 8

F

file compression ratio
 defined 14
 typical 15
file systems 14
filesystem status 15

G

getting help 6
GUI
 device monitor 9
 media and device management 9

H

hardware
 compatible components 7
help, obtaining 6
high availability 17
history 7
HP
 authorized reseller 6
 storage website 6
 technical support 6

I

implementation troubleshooting 18
installation
 best practices 12
 checklist 12
 recommendations 13
 server software, recommended order 13
 Symantec NetBackup Enterprise Server 13
 troubleshooting 18

M

master server
 adding a storage unit 14
 defined 8
media and device management GUI 9
media manager
 defined 9
media server
 defined 9

O

online storage 7
operating systems, supported 8

P

performance 14
policies, setting 14
prerequisites 4

R

rebooting, limit during backups 12
related documentation 4

S

SCSI RESERVE/RELEASE 12
shared storage option 10
solution
 components 7
 features 7
source disk 14
storage connection 14
storage devices, defining 13
storage unit
 defined 9
SuperDLT320, device configuration wizard 12
supported configurations 11
Symantec NetBackup Enterprise Server
 architecture 8
 backup jobs 8
 client software 8
 described 8
 EBS requirements 9
 features 8
 installation 13
 media manager 9
 shared storage option 10
symbols in text 5

T

tape drives 14
 determining backup and restore performance 16
 throughput speed 16
technical support, HP 6
text symbols 5
troubleshooting 18
tuning 14

V

volume configuration wizard 9

W

websites
 HP storage 6
wizards
 device configuration 9
 volume configuration 9